



*Citation for published version:*

Patel, M & Beagrie, N 2011, 'The benefits of more effective research data management in UK Universities: Financial challenges - digital opportunities', Paper presented at JISC Conference 2011: Financial Challenges - Digital Opportunities, Liverpool, UK United Kingdom, 14/03/11 - 15/03/11.

*Publication date:*  
2011

*Document Version*  
Publisher's PDF, also known as Version of record

[Link to publication](#)

*Publisher Rights*  
CC BY-SA

**University of Bath**

## **Alternative formats**

If you require this document in an alternative format, please contact:  
[openaccess@bath.ac.uk](mailto:openaccess@bath.ac.uk)

### **General rights**

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

### **Take down policy**

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.



## Infrastructure for Integration in Structural Sciences

The benefits of more effective research data management  
in UK Universities

Manjula Patel & Neil Beagrie

UKOLN, University of Bath & Charles Beagrie Ltd.

JISC Conference 2011: Financial Challenges – Digital Opportunities

BT Convention Centre, Liverpool

Tuesday 15th March 2011



This work is licensed under a Creative Commons Licence: Attribution-ShareAlike 3.0  
<http://creativecommons.org/licenses/by-sa/3.0/>



Infrastructure for  
Integration in Structural Sciences

# I2S2 Project Overview

- Show how effective cross-institutional research data management can **increase efficiency and improve the quality of research**
- Understand and identify **requirements for a data-driven research infrastructure** in the Structural Sciences (physical science experiments)
  - Examine localised data management practices
  - Investigate data management infrastructure in large centralised facilities
- **Scale and complexity**: small laboratory to institutional installation to large scale facilities e.g. Diamond Light Source & ISIS, STFC
- **Interdisciplinary issues**: research across domain boundaries
- **Data lifecycle**: data flows and data transformations over time



Infrastructure for  
Integration in Structural Sciences

# Generalised Issues

- Basic requirement for **data storage and backup** facilities to sophisticated needs such as **structuring and linking** together of data
- **Management of intermediate, derived and results data** a major issue
- **Contextual information** is not routinely captured
- Processing pipeline is dependent on a **suite of software**
- The actual **workflow or processing pipeline** is not routinely recorded
- Need for adequate **metadata and contextual information** to support:
  - Maintenance and management; Linking together of all data associated with an experiment; Referencing and citation; Authenticity; Integrity; Provenance; Discovery, search and retrieval; Curation and preservation; IPR, embargo and access management; Interoperability and data exchange
- Simplification of inter-organisational communications and **tracking, referencing and citation of datasets**
  - Unique persistent identifiers
  - Standardised Experiment Risk Assessment forms
- Solutions should be as **non-intrusive** as possible



Infrastructure for  
Integration in Structural Sciences

# An Integrated Service Approach

- Considerable variation in data management requirements across **differing scales of science**
- Individual researcher, group, department, institution, facilities all **working within their own frameworks**
- Merit in adopting an **integrated framework** which caters for all scales of science:
  - Aggregation and/or cross-searching of related datasets
  - Efficient exchange, reuse and repurposing of data across disciplinary boundaries
  - Data mining to identify patterns or trends
- **I2S2 Integrated information model aims to:**
  - Support the scientific research activity lifecycle model
  - Capture processes and provenance information
  - Streamline flow of metadata, administrative information and experiment data across organisations
  - Interoperate with and complement existing models and frameworks



Infrastructure for  
Integration in Structural Sciences

# Benefits - Background

- Based on two use cases:
  - Prof Martin Dove, Earth Sciences, University of Cambridge – researcher perspective
  - Dr Simon Coles, National Crystallography Service, Southampton – service perspective
- Methods developed/enhanced and used:
  - I2S2 Research Activity Lifecycle Model and KRDS Benefits Taxonomy
  - Charles Beagrie Ltd. Value Chain and Impact Analysis Tool
  - Value and Impact elaborated for each perspective by Neil Beagrie working jointly with Martin and Simon



Infrastructure for  
Integration in Structural Sciences

# Key Benefits Identified

- Impact and value for researcher (qualitative):
  - **research effectiveness** – reduced time latency for accessing data sets (24hrs+ down to 5-10mins)
  - **disseminating research methods** – documented datasets accessible for remote training and learning by (many) new users
  - **enhanced research tools** – more quality datasets for developers testing and improving tools (software, algorithms, methodologies etc.)
- Impact and value for central service (quantitative):
  - **research and facility efficiency** – time savings aggregated over many samples /experiments /researchers at facility
  - **visibility and security of datasets** – increased citation and effectiveness of research in the long-term
  - **less likelihood of errors** – in data exchange chain between researchers and various facilities (e.g. safety and administrative information)



Infrastructure for  
Integration in Structural Sciences

# Benefits Conclusions

- Researcher and Service perceptions of benefits can be and often are different but complementary
- For I2S2, both are positive on benefits that would accrue from implementation
- Impact cannot always be measured within timeframe of project – where appropriate we have established benchmarks against which future progress can be measured
- Finally a similarity to measuring impact in Research Excellence Framework (REF) – a valuable experience for partners given future landscape of research assessment

Diamond Light Source (DLS),  
Science & Technology Facilities Council, UK







Infrastructure for  
Integration in Structural Sciences

# Project Team

- Liz Lyon (UKOLN, University of Bath & Digital Curation Centre)
- Manjula Patel (UKOLN, University of Bath & Digital Curation Centre)
- Simon Coles (EPSRC National Crystallography Centre, University of Southampton)
- Neil Beagrie (Charles Beagrie Ltd.)
- Brian Matthews (Science & Technology Facilities Council)
- Erica Yang (Science & Technology Facilities Council)
- Martin Dove (Earth Sciences, University of Cambridge)
- Peter Murray-Rust (Chemistry, University of Cambridge)

[m.patel@ukoln.ac.uk](mailto:m.patel@ukoln.ac.uk)

<http://www.ukoln.ac.uk/projects/I2S2/>